

EXHIBIT 9

Belcore

 Bell Communications Research

Belcore's Response to CTIA Request For Information on Number Portability

ST.96.001.RFI

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Executive Summary

*Bellcore's ISCP
system provides a
centralized LNP data
base solution for
wireless Local
Number Portability.*

EXECUTIVE SUMMARY

Local Number Portability (LNP) is the most complex and far-reaching change to the existing national communications infrastructure attempted so far. And it's only the beginning ...

LNP is an element of the Telecommunications Act of 1996 and is being mandated by Federal and state regulation. All wireless carriers, cellular and PCS, are affected by this mandate and will have to accommodate the new capabilities to comply with it.

LNP changes the definition and operation of local telephone number, roaming service, network addressing, call processing, interconnection arrangements, business operations, information systems flows and billing, along with many other operations critical to your business.

Specifically, wireless service providers must be able to complete a call to a ported wireline number by December 31, 1998 and provide the capability for wireless service provider portability by June 30, 1999.

Bellcore is currently enhancing the ISCP product to conform to the industry defined requirements for Local Number Portability (LNP). The two key functions required of the LNP SCP are:

- Supporting the *Location Routing Number (LRN)* model for LNP queries: The ISCP/LNP will support the LRN model for providing the necessary information back to the switch for routing calls to ported numbers. The ISCP/LNP will support both the AIN and IN query formats for LRN.
- Providing the *Message Relay Service (MRS)*: The ISCP/LNP will also support the MRS that allows the ISCP to receive service messages, perform a 10-digit translation on the relevant address if the number has been ported, and relay those messages to the recipient switch or network data base. This functionality is necessary to ensure the proper routing of LIDB, Calling Name Delivery Service, Originating Line Number

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Screening (OLNS), CLASSSM, and Interswitch Voice
Messaging (ISVM) queries in a portability environment.

*Bellcore supports the
development and
implementation of
new
telecommunications
and computing
services and
technologies.*

Wireless service providers can isolate and minimize the changes to their network by deploying a centralized ISCP LNP and taking advantage of the MSC's existing routing capabilities. Calls bound for a ported wireline exchange can be routed by the MSC to an LNP capable network switch for querying the ISCP LNP data base. Ultimately, the MSCs will need to be enhanced to support an Intelligent Network LNP data base query to access the ISCP LNP data base directly.

Another key component of Bellcore's LNP solution is the Local Service Management System (LSMS). In the area of LSMS functionality, Bellcore is offering a highly scaleable solution that builds on our Advanced Service Management System line of products. The LSMS provides the administration of the ISCP/LNP data bases. It also connects to the Number Portability Administration Centers (NPACs) for receipt of subscriber information from various service providers. Bellcore recognizes that each customer has a very unique Operations Systems infrastructure, and may want their LSMS system to perform a wide range of functionality. To address this, Bellcore is offering both a low end solution that performs only those functions necessary to meet the LNP requirements, and a high end solution that provides extended functionality.

The recommended solutions are based on Bellcore's combined experience in designing the local telecommunications network and serving the number portability and wireless markets with commercially available products that deliver a high level of customer satisfaction.

The ISCP software, a valuable network element, has a strong record of successful performance since its introduction in 1992. The ISCP platform is designed to meet the stringent requirements of telephone companies for reliability and availability. Network reliability is achieved through hardware and software redundancy, automated error detection and recovery logic, as well as geographically diverse system deployment. No single hardware or software failure can bring the ISCP software system down. The

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ISCP systems have over 113 years of product service deployment without a single service interrupting outage.

The ISCP system components are deployed in over 140 sites supporting revenue producing services. Today, the ISCP is a trusted and reliable platform that commands a 65% global intelligent network market share. With its flexibility, versatility and ease of use, the ISCP platform provides local, domestic, international, wireline and wireless service providers the power to compete and win in the years ahead. This high level of acceptance has given Bellcore the practical, day-to-day experience demanded of vendors in today's competitive marketplace.

Bellcore possesses the resources necessary to make the ISCP LNP solution work with wireless service providers' planned network strategy. We have the systems engineering, systems analysis, and technical expertise required to turn wireless service providers' objectives into a reality.

This response addresses sections 5.1 through 5.7.1 of RFI. Throughout the response, areas requiring further study have been identified. Bellcore's Professional Services organization is in a position to identify potential solutions to these areas of study.

Bellcore Understands Number Portability

Bellcore is the company that helped service providers design the local telecommunications network in the United States. We have extensive expertise and experience in number portability.

- The communications industry recognizes Bellcore as the vendor-carrier neutral arbiter of the Generic Requirements that keep the competitive North American telecommunications network as the most used, reliable and customer-focused network in the world.
- Bellcore has provided the technological leadership in implementing equal access, alternative billing services, 800 portability and 888 implementation.

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- Bellcore has unequalled knowledge and expertise in the area of number portability as demonstrated in our development and implementation of 800 number portability. Bellcore solutions has successfully ported all 800 numbers from its inception.
- Bellcore network software systems, Service Control Points (SCP) and Service Management Systems (SMS) have the proven reliability and performance needed to meet the new challenges of the competitive markets. These systems have completed 800 service calls with zero unscheduled downtime over the past five years.
- Bellcore's Professional Services organization has produced Generic Requirements (GR-2936-CORE) addressing Local Number Portability issues for the wireline industry.

Bellcore Contact

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5. Specific Requests for Information

The remainder of this response follows the section numbering of the CTIA RFI on Number Portability. This response describes Bellcore's ISCP system which provides a centralized LNP database solution for wireless Local Number Portability. Specifically, sections 5.1 through 5.7.1 are addressed.

If responding with a total network solution, please provide an end to end overview description of the proposed architecture for number portability, as noted in Section 5.1. In addition, please provide the specific details as required for Section 5.2 through 5.8.

If responding to specific sections only, i.e., Central database, please provide an overview of how the proposed solution interfaces with the current network architecture.

Please include the changes needed to today's cellular networks and a description of any assumptions made concerning deployment. Also, please identify any deployment options intended.

5.1. Proposed Architecture Overview

The end to end proposal should include but is not limited to:

- **Network Elements:**

Does the architecture use any one or a combination of the following: STP, SCP, ISCP, IP, MSC, etc. If so, what information and process needs to be available at each element? Is more than one database required?

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The architecture shown in Figure 1 represents an example of a wireless intelligent network architecture that can be utilized to accomplish the routing tasks associated with wireless local number portability.

The Location Number Portability (LNP) database shown in

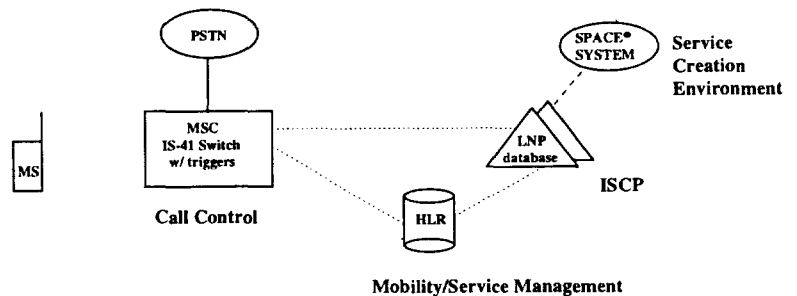


Figure 1 - Architecture Overview

Figure 1 exists in the ISCP intelligent network node. This database is queried by the MSC (and possibly the HLR) and responds with an appropriate LRN associated with the ported number.

- **Triggering:**

Identify any trigger mechanisms and protocols used, and at which points in the network for this architecture? (ITU IN CS 1R, ANSI IN, AIN, WIN?)

The implementation of an intelligent network solution to local number portability routing relies upon suspension of call/signaling processes to launch a query to the LRN database. The query response will contain the necessary routing information for the call/signaling process to

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continue. The suspension point may be identified as a trigger point in a call or mobility model. Triggers are defined in ITU, ANSI or other documents and are implemented in the MSC. Bellcore's ISCP system currently supports a variety of intelligent network protocols (IS-41, IN-AIN, ETSI Core INAP). Whichever protocol(s) the wireless industry decides to implement to query the LNP database the Bellcore ISCP will respond appropriately.

- **Gateway Requirements:**

Are there requirements for a new gateway function for wireless networks?

Our intelligent network database approach does not seem to impact wireless gateway switches, however, more study in this area may be warranted as processes are further defined.

- **Network Routing Number Entity:**

Under the LRN process to which network element does the network routing number point? (MSC-Home, HLR, MSC-Gateway, mobile network gateway.)

Our opinion is that the LRN should point to the MSC-Home. In the case of signaling messages associated with registration and authentication¹ the IS-41 message is embedded in an SS7 TCAP transaction and is SCCP GT routed towards the MSC-Home. The Home-System's Gateway STP identifies the content of the envelope (for signaling network integrity purposes), performs the global title translation and routes the messages directly to the HLR.

¹ A possibility exists for location request messages to be include in this grouping. Bellcore has previously shown in other publications efficient routing methods that may be implemented by intelligent networks of the PSTN. In effect these originating wireline networks would suspend a call to a wireless customer and launch a location request message to the HLR. The route returned from the VLR via the HLR may bypass the MSC-Home and be more efficiently routed.

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- **Central Database:**

Is a central database for wireless use required for identification of HLRs or are there other methods available?

Wireless customers who have ported their numbers from other service providers will need to be identified by their number and LRN (new MSC-Home). A specification to add the Point Code of the new HLR may be helpful. The routing of authentication and registration signaling messages if SS7 MTP routed requires the DPC of the HLR.

NPACs as presently defined by the FCC are regional in nature and do not adequately address a wireless customer who has roamed out of the FCC defined regions. A centralized, national NPAC for wireless ported customers may address this issue.

- **SS7 Global Titles:**

Identify any impacts on current SS7 Global Title processes. (MIN to MSC, MIN to HLR, IMSI to MSC, IMSI to HLR?)

We assume continued use of the MIN to MSC and MIN to HLR routing. It is assumed that the serving MSC for originating services (authentication, registration and routing to a ported number) will have previously triggered on the ported NPA-NXX of the MIN or the dialed digits and received the LRN (MSC-Home) in the response to an LNP query. Hence, the GTT process is not affected.

A new transaction type has been requested to support the Message Relay Service. STPs will need to recognize this translation type.

- **System performance:**

Identify any expected performance implications/impacts on: normal call processing, post dial delay, registration, authentication, roaming?

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In the intelligent network database solution there are two instances where the LRN query/response process is used; for initiating services in a roamed-in system (authentication, registration) and for routing to a ported number. An additional transaction will incur a time penalty, typically of a few 100 ms.

5.2. Network Functionality

Please include a detailed description of each network functionality with the associated call flows and involved network elements.

5.2.1. Registration:

How should mobile registration be accomplished under number portability?

Given that today we use the MIN which is currently the Mobile Directory Number (MDN) and that we have agreed to move to the use of IMSI with the new digital technology, what process should be used to register mobiles under number portability?

Now that the MDN (and consequently the MIN based on today's use) could be ported to or from another provider including wireline, is there a solution to avoid changing the imbedded base of analog phones?

Could a process separating MIN and MDN be used?

Could we use a process based on Mobile Station Identification (MSID) e.g. IMSI plus pseudo-IMSI for the MDN as MIN based phones?

Is there a solution that avoids extensive ten digit Global Title Translations (GTT) for routing Mobile Application Part messages?

What are the international implications?

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Describe the process flow and protocol implications. Describe the impacts on all network elements. Include the implications on current standards, i.e. IS-41, IS-136, TDMA, CDMA, GSM.

Today users who roam into a visited area are identified by their MIN. The serving system is able to determine, via an MSC lookup, if they have a roaming agreement with the user's MSC-Home.

With local number portability visiting users who have a MDN from an NPA-NXX that has one or more ported customers cannot be positively associated with a particular wireless provider's HLR. At this point a query to the LNP database will result in the LRN of the visiting user's MSC-Home (new or otherwise) which now may be used to identify the visitor's wireless provider. At this point the registration process continues unchanged from current processes.

5.2.2. Authentication

How will authentication be supported in a Service Provider, Number Portability environment?

The authentication process itself will be affected in the same way that the registration process is impacted as described in section 5.2.1. The authentication request invoke will need to be sent to the proper HLR/AC. Roamer agreement tables will need to be checked and if the MDN of the user is from an NPA-NXX that has one or more ported customers cannot be positively identified as a customer of any wireless provider. At this point a query to the LNP database will result in the LRN of the visiting user's MSC-Home (new or otherwise) which now may be used to identify the visitor's wireless provider. At this point the authentication process continues unchanged from current processes.

It is important to note that the "extra" step for LNP is only needed once. The VLR may store the OPC of the

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original authentication request return result and therefore properly address subsequent messages to the HLR/AC.

5.2.3. Call Handling

5.2.3.1. Call Origination on MSC

- Can a determination be made that the call is to another mobile for potential services and call routing efficiencies?
- Will the MSC use the SS7 Call Completion to Portable Number (CCPN) network capability?
- How is the appropriate subscriber information - ANI (charge number) and calling party number correctly populated
- Any other options are encouraged to address the following questions

5.2.3.1.1. To Wireline

What changes need to be made to allow the MSC to do the LNP query for a local call?

How will the MSC interact with the routing databases when defined?

How is the call processed if the call is beyond the local area?

What types of triggers are used?

What are the protocol impacts - IS-41, IS-652, etc.?

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Are there efficiencies that can be applied?

5.2.3.1.2.To Wireless

Are there efficiencies which can be developed for delivery to a wireless user or must the procedure be the same as for wireline delivery?

What are the protocol impacts and performance implications. Can efficiencies be implemented?

Can we avoid the trunking to the home location and then trunking to the visited location?

How is the location request message routing handled? (e.g. GTT at STPs, GTT to HLR,...)

5.2.3.2. Call delivery to Mobile Station

How will call delivery to a mobile station be accomplished?

Will a network routing number be assigned to each MSC?

If efficiencies are applied, can we avoid triggering the LNP processes in routing to the termination location?

How is the location request message routing handled? (e.g. GTT at STPs, GTT to HLR,...)

As Local Number Portability moves forward it can be envisioned that a time may be reached when serving wireless systems may trigger on all

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originating calls and all registration attempts. As this point in time is approached, the flexibility and extensibility of a wireless intelligent network solution will enable maximum synergy with switch triggers, multiple protocols and integration with other networks (e. g., wireline).

An inherent capability of an intelligent network is the ability to branch off an invocation to perform other tasks, such as executing service scripts. In addition intelligent networks are capable of reformatting messages and may act as "protocol converters" logically tying disparate network intelligence together.

These intelligent network capabilities may apply to all calls originating or terminating on serving wireless systems to wireline or wireless networks. Wireless service providers who choose to implement an intelligent network infrastructure will enable their networks to efficiently evolve to serve their customer base.

5.3. Roaming Issues

How will the roamer tables be handled with number portability?

What are the implications to performance, protocols, and architectures?

How will roaming with Mexico and Canada be accomplished?

How would roaming with other countries using the same technology work?

As more subscriber's numbers are ported, NPAs will not be associated with the geographical location of a switch any more. Therefore, subscribers who register with their home MSC will eventually be processed in the same fashion as roamers.

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The additional dip into the external routing database may be accomplished using existing intelligent network protocols. However, an additional transaction will incur a time penalty of a few 100 ms.

Roaming into foreign countries requires alignment of the numbering plans and mobility management protocols on an international level (see also section 5.5)

5.4. Database issues

What are the implications of databases to our networks?

What wireless information should be added to the currently proposed SMS and SCP databases?

Should wireless develop their own database for each HLR location?

Is the development of mobile station identification database an issue? Does it address administration?

What are the implications of using another carrier's database or query process?

The Bellcore offering for the LNP SCP functionality is the ISCP product. Bellcore is currently enhancing the ISCP product to conform to the industry defined requirements on LNP. The two key functions required of the LNP SCP are:

- *Supporting the Location Routing Number (LRN) model for LNP queries: The ISCP/LNP will support the LRN model for providing the necessary information back to the switch for routing calls to ported numbers. The ISCP/LNP will support both the AIN and IN query formats for LRN.*
- *Providing the Message Relay Service (MRS): The ISCP/LNP will also support the MRS that allows the ISCP to receive service messages, perform a 10-digit translation on the relevant address if the number has been ported, and relay those messages to the recipient switch or network data base.*

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This functionality is necessary to ensure the proper routing of LIDB, Calling Name Delivery Service, Originating Line Number Screening (OLNS), CLASS and Interswitch Voice Messaging (ISVM) queries in a portability environment.

In addition to the network services, the ISCP LNP solution supports the following features:

- *Data Administration - The ISCP solution supports the open SPI (Service Provisioning Interface) as the means to administer the LNP data.*
- *Capacity to Accommodate Future Growth - Based on the FCC schedule to transition to LNP, it is anticipated that the LNP query rate will grow dramatically. To accommodate this anticipated LNP query growth, the ISCP/LNP application will migrate to the Next Generation Platform (NGP) expanding the supported SS7 link configuration from 24 to 64 links per mated pair by August, 1997. The first Metropolitan Statistical Area (MSA) supporting LNP is targeted for cutover by October, 1997. The ISCP LNP product is scaleable to meet both LNP traffic and data base forecasts as the application gets deployed.*

Additional features provided by the ISCP LNP solution include:

- *Service Creation - The ISCP LNP solution could enable wireless service providers to use service creation for LNP. Service creation, through the SPACE system, would allow wireless service providers to change the service as industry requirements/trends evolve. The ISCP product proposed does not include service creation and would be deployed if wireless service providers believe the LNP service is fairly well defined.*
- *Measurements and Billing - To date, the industry has not defined what measurements, either node, application, or billing, need to be collected at the LNP data base level. However, through the use of a service creation capability, the ISCP LNP solution could support custom billing and measurements to the LNP service. The Data Distributor*

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(DD) and Data and Reports System (DRS) components of the ISCP LNP solution could be used to provide billing and reporting information for wireless service providers

The ISCP product provides wireless service providers with a platform that has a proven record of reliability coupled with the high capacity, high throughput needed to deploy this application. Rollout of the ISCP LNP product can begin as early as March, 1997.

5.5. Mobile Station Identification issues

What should our long term identification method be?

Should we focus on IMSI as the identification?

Can we transition from MIN to IMSI gracefully?

Would it be possible to use a pseudo-IMSI based on MIN?

Could a process separating MIN and MDN be used?

Can IMSI be used for other processes rather than MIN?

Questions related to numbering are a very important issue. Whereas Bellcore's technical solutions and products will allow users to utilize any number format, we believe that in the long term Mobile Stations should be identified by a carrier independent number that allows for international roaming and that allows for alignment with the wireline numbering plan.

5.6. Service Interactions

5.6.1. Over the Air Activation (OTA)

How will OTA work given number portability?

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If we changed to IMSI, can an IMSI be changed via OTA if the customer changes providers or wants another provider upon activation?

Calls to the activation center can be established like normal calls. The process between the customer and the activation center may have to be reviewed in order to incorporate the utilization of the MDN.

5.6.2. Short Message Services

How will short message service operate under number portability?

Are there implications for short message service protocols?

In order to deliver a message the message center has to perform a dip into the LNP database to obtain the address of the MSC-Home. The Home-System's Gateway STP identifies the message, performs the global title translation and routes the message directly to the HLR.

5.6.3. Data Services

How will data services operate under number portability?

Are there implications for the protocols?

If MDN is used to establish the data connection, the message center has to perform a dip into the LNP database to obtain the address of the MSC-Home. The Home-System's Gateway STP identifies the message, performs the global title translation and routes the message directly to the HLR.

Further study is required for other numbering plans and addressing schemes.

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5.6.4. Emergency Services

How will emergency services be impacted by number portability?

Can Enhanced-911 be supported in a Service Provider Number Portability environment? What are the impacts?

If call origination is permitted by the local service provider, normal 911 service will not be impacted, i.e., calls can be delivered to a 911 Public Service Answering Point (PSAP).

Enhanced 911 features will rely on the MDN for call back and possibly the identification of the handset. Depending on the compliance degree with current FCC requirements for locating the handset, further study may be required.

5.6.5. Operator Services

What are the impacts on Operator Services?

Calls to an operator position can be established in a similar fashion as normal calls. The impact of LNP on the overall context of operator services may require further study.

Message Relay Service on the Bellcore ISCP may be utilized to access line and credit card information databases.

5.6.6. Other impacts on Existing Services and Features

What are the impacts on IS-52 services, e.g. CLASS type services?

Are there any existing or planned services/features which are impacted by number portability not covered above? Please describe.

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Response

The IS-52 based feature codes are not impacted by LNP.

However, the impact on IS-53 based CLASS services, which require a query to a line oriented database, needs further study.

5.7. Operational Support Systems

5.7.1. Service Management System (SMS)

Please identify any wireless requirements for the SMS. Also, identify any needed interfaces with the SMS or its databases. Please identify any unique needs of the wireless networks over wireline.

Another key component of Bellcore's LNP solution is the Local Service Management System (LSMS). LSMS provides the administration of the ISCP LNP data bases. It also connects to the Number Portability Administration Centers (NPACs) for receipt of subscriber information from various service providers (wireline and wireless). It is anticipated that the requirements for the interfaces to NPAC will be standardized within the industry.

Bellcore recognizes that each customer has a very unique Operations Systems infrastructure, and may want their LSMS system to perform a wide range of functionality. To address this, Bellcore is offering both a low end solution that performs only those functions necessary to meet the LNP requirements as well as a high end solution that provides extended functionality.